March 2003

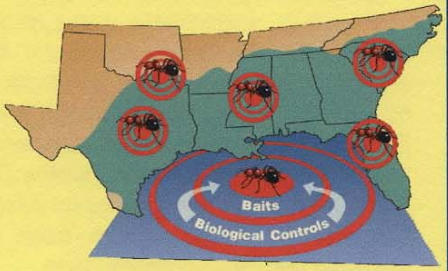
USDA-ARS

AREAWIDE SUPPRESSION OF FIRE ANTS

USDA Agricultural Research Service CMAVE

Welcome!

This is an update on the USDA-ARS **A**rea**W**ide **S**uppression of **F**ire **A**nt (AWSFA) project. This areawide project was conceived based on excellent results from a pilot project at Ft. Jackson in SC. The Ft. Jackson project utilized an integrated approach to control fire ants, including chemical baits and biological control agents. AWSFA focuses on providing self-sustaining, biologically-based integrated control tactics, that are safe and effective in urban, agricultural and natural ecosystems. It uses permanently established biocontrol agents and reduced chemical pesticide applications to suppress fire ant populations. AWSFA's objective is the demonstration of long-term control of fire ants over large areas.



Demonstration sites have been established in all 5 cooperating states, and initial introductions of biological control agents and applications of chemical baits have been done in all sites. Spring 2003 will bring to close the first year since the initial field implementation of the program. Evaluations are scheduled by all the personnel involved to assess the progress in controlling the fire ants and the need for additional applications.

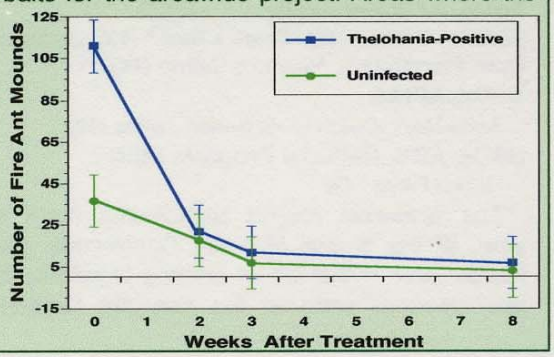
A website describing the project, its principal components, the fire ant biology and natural enemies used in the project, and other aspects related to management of fire ant populations is online at **www.cmave.saa.ars.usda.gov/fireant/.** This website also contains some exciting video clips illustrating aspects of the life cycle of decapitating flies, slideshow on the fire ant expansion in the US and much more. These updates will also be posted at that site. Check it out!

Study predicts imported fire ant infestation area in US

Scientists from the USDA-ARS, CMAVE in Gainesville, FL and the University of Arkansas at Monticello used mathematical and weather models to predict the future range of the red imported fire ant in the United States. A dynamic model of colony growth was developed which depended on daily maximum and minimum soil temperatures. Temperature records at 4,537 meteorological stations were obtained from NOAA's National Climatic Data Center. Detailed maps with study results have been posted at **http://cmave.usda.ufl.edu/ifahi/ifarange_us.html**, where a copy of the study can also be obtained. Four zones of colony success were defined: certain, possible, undemonstrated, and improbable. An annual precipitation limit was selected to indicate regions where fire ants may not occur in non-irrigated areas. Results (see map) predict that red imported fire ants will likely move 50-100 miles north in Oklahoma and Arkansas. They will also likely continue expanding into portions of Virginia, Maryland, and Delaware in the east and New Mexico, Arizona, California, Oregon, Nevada, and maybe even Washington and Utah in the west.

Thelohania solenopsae enhances chemical bait effects

USDA-ARS, CMAVE scientists tested whether the fire ant pathogen *Thelohania solenopsae* affects the ability of fire ants to survive exposure to the active ingredient in the most popular fire ant bait products. Hydramethylnon treatments were made against red imported fire ant individuals and colonies that were either infected or uninfected with *T. solenopsae*. In laboratory experiments, polygynous *T. solenopsae*-infected fire ant colonies had greater mortality than uninfected colonies when exposed to hydramethylnon. Nearly 100% of the individuals in the *T. solenopsae*-infected colonies died in contrast with only 50% of the individuals in the uninfected colonies. The queens from infected colonies also exhibited higher mortality than uninfected ones. Similar results were observed in studies in fire ant-infested pasture treated with hydramethylnon bait. The number of *T. solenopsae*-infected colonies decreased much faster relative to uninfected colonies in the same area (see figure). The fire ant pathogen *T. solenopsae* can enhance the toxicity of hydramethylnon, making infected workers 2.4-fold more vulnerable to the chemical. These results support the decision to use a mixture of hydramethylnon and methoprene baits for the areawide project. Areas where the pathogen is present should have more efficient fire ant control when the chemical baits are used.



AWSFA Project Update

Demonstration Sites

The integrated (biological control/chemical bait) and the control sites in all states were sampled for baseline data on fire ant population, ant activity, and native ant population. Bait treatments were completed in these sites, and were repeated in FL and TX again in Fall 2002 because fire ant populations were still above established threshold. The decapitating flies and the protozoan *T. solenopsae* were introduced in the biocontrol sites and have been recovered from field populations demonstrating establishment of these biocontrol agents. Only a limited release of the protozoan *T. solenopsae* was done in MS, but new releases are planned for the Spring 2003.

Economic Component

A farmer survey and a researcher survey have been prepared to access the economic value of the integrated control of fire ants in pastures. When completed these surveys will allow estimation of cost associated with fire ant damage to different farm operations, as well as the benefits and costs of fire ant control. Surveys have been distributed to all the state cooperators (TX, SC, MS, OK, and FL) and will be returned to researchers in Texas for analysis.

Educational Component

A website (**http://fireant.ifas.ufl.edu**) and a brochure have been developed to inform the public about the areawide project, fire ants and their control. The brochure containing the project description and other information on fire ant biology and control has been distributed to cattle farmers in all 5 cooperating states (TX, MS, OK, SC, FL). Also, several other educational videos on fire ant biology, behavior and control have been prepared for use in scientific and other presentations.

Research Component

A new biotype of the decapitating fly *Pseudacteon curvatus,* currently established in AL and MS, has been obtained from South America, and was field released at the biocontrol site in FL in March 2003. This new biotype comes from *S. invicta* in South America, and is better adapted to this fire ant species than the previously introduced biotype. Another decapitating fly, *P. litorallis* will also be released in the field soon. Scientists Sanford Porter and David Oi will be traveling to South America in April 2003 in search of new parasites and pathogens that may be added to the biological control arsenal against the fire ants here in the US.

AWSFA Technical Committee (*) and Collaborators

(Numbered in left-to-right order from picture below)

USDA-ARS, Ctr. for Medical, Agric. and Vet. Entomol.
David Williams * (8), Bob Vander Meer * (3), David Oi * (1), Sanford Porter * (6), Steve Valles * (5), Roberto Pereira * (4)

University of Florida
Philip G. Koehler * (7)

USDA-ARS, Jamie Whitten Delta States Res. Center
Doug Streett * (2), J.T. Vogt *

Oklahoma State University
Russell Wright * (17), Wayne Smith * (19)

Clemson University
Mac Horton * (16), Tim Davis * (15)

Texas A&M University
Bastiaan Drees * (12), Charles Barr * (13), Curtis Lard (11), Ryan Titzman (10), Alejandro Calixto (14)

USDA-APHIS
Anne-Marie Callcott *, Shannon James (18)

USDA-ARS, National Program Staff
Robert Faust * (9)

The areawide project participants meet twice a year, at the annual Fire Ant Conference, usually in March, and in the fall at rotating locations. The last two meetings were at the Fire Ant Conference in Athens GA, and in Gainesville, FL on September 24, 2002 (pictured below). The next meeting will be on March 30, 2003 at the Fire Ant Conference in Palm Springs, CA. During the conference, Roberto Pereira will moderate a section reserved for reports related to the USDA areawide project. Cooperators will present a quick update on the demonstration sites in each state. This will be the first public update on the AWSFA at a scientific meeting.